

CLAIMS

What is claimed is:

1. An image forming apparatus having a housing and including a cartridge unit removably mounted in said housing, comprising:
 - a pivot member fixed to said housing;
 - a first arm pivotally mounted in said housing about said pivot member, said arm in contact with said cartridge unit; and
 - a force generating member mounted in said housing and contacting said arm so as to urge said arm to pivot about said pivot member and press against said cartridge unit;whereby the force exerted on said cartridge unit by said arm varies according to the point of contact between said cartridge unit and said arm.
2. The image forming apparatus of claim 1 wherein said arm includes a contact member having a longitudinal extent, and where said cartridge unit contacts said arm along said contact member.
3. The image forming apparatus of claim 2 wherein said cartridge unit includes a protrusion in the direction of said arm such that contact between said cartridge unit and said arm occurs at said protrusion.
4. The image forming apparatus of claim 3 wherein the force exerted on said cartridge unit by said arm varies according to the position of contact of said protrusion along said contact member.

5. The image forming apparatus of claim 4 wherein said force ranges from about 45% to about 150% of the force of said force generating member.
6. The image forming apparatus of claim 5 wherein said contact member has a length of about 16 mm.
7. The image forming apparatus of claim 2 wherein said arm includes a force receiving member, and wherein said force receiving member and said contact member extend from said pivot point at a generally right angle.
8. The image forming apparatus of claim 1 wherein said force generating member is a spring.
9. The image forming apparatus of claim 1 further comprising a second arm, said first and second arms contacting said cartridge unit at opposite ends thereof.
10. The image forming apparatus of claim 1 wherein said removable cartridge unit includes a developer roller operative to develop a latent image by supplying toner thereto.
11. The image forming apparatus of claim 1 wherein said removable cartridge unit includes a photoconductive drum carrying a latent image.
12. The image forming apparatus of claim 1 wherein said removable cartridge unit includes one of a developer roller and a photoconductive drum, and wherein the variable force applied to said cartridge unit by said arm contributes to the nip force between said one of a developer roller or photoconductive drum and the other of a developer roller or photoconductive drum.

13. A method of controlling the force exerted on different removable cartridge units by an image forming apparatus, comprising:

providing at least one arm pivotally mounted in said image forming apparatus about a

pivot point and biased by a force generating member into contact with a

removable cartridge unit having at least one protrusion, said arm including a

contact member having a longitudinal extent and wherein said protrusion

contacts said arm along said contact member;

positioning a first protrusion on a first removable cartridge unit to contact said contact

member at a first longitudinal position, said arm thereby exerting a first force on

said first cartridge unit; and

positioning a second protrusion on a second removable cartridge unit to contact said

contact member at a second longitudinal position different from said first

longitudinal position, said arm thereby exerting a second force on said second

cartridge unit different from said first force.

14. The method of claim 13 whereby said first force is greater than said second force if said first protrusion on said first cartridge unit contacts said contact member at a position closer to said pivot point, when said first cartridge unit is mounted in said image forming apparatus, than said second protrusion on said second cartridge unit contacts said contact member, when said second cartridge unit is mounted in said image forming apparatus.

15. An image forming apparatus, comprising:
a housing, including two fixed pivot points;
two arms, each pivotally mounted about a different said pivot point, each said arm
including a force receiving member and a contact member having a longitudinal
extent;
two force generating members, each exerting a first force at a position on the force
receiving member of a different said arm, biasing said arm to pivot about said
pivot point; and
at least one removable cartridge unit housing a first roller and having two protrusions,
each of which contacts the contact member of a different said arm along the
longitudinal extent thereof such that each said arm exerts a second force on
said cartridge unit through said protrusion.
16. The image forming apparatus of claim 15 wherein said arms and pivot points are
disposed in said housing such that said contact members contact said protrusions proximate
each end of said cartridge unit, in an axial direction of said first roller.
17. The image forming apparatus of claim 16 wherein the magnitude of said second force
varies in response to the relative position of each said protrusion along the longitudinal extent
of each said contacting contact member.
18. The image forming apparatus of claim 17 wherein the magnitude of said second force is
equal to the magnitude of said first force multiplied by the distance from said pivot point to said
position of application on force receiving member, divided by the distance from said pivot point
to the position of contact between said protrusion and said contact member.

19. The image forming apparatus of claim 17 wherein said second force is a component of the nip force between said first roller and a second roller in said image forming apparatus.

20. An image forming apparatus having a housing and including a cartridge unit removably mounted in said housing, comprising:

a pivot member fixed to said housing;

a first electrically conductive arm pivotally mounted in said housing about said pivot member, said arm in electrical contact with said cartridge unit; and

a force generating member mounted in said housing and contacting said arm so as to urge said arm to pivot about said pivot member and press against said cartridge unit;

whereby the force exerted on said cartridge unit by said arm varies according to the point of contact between said cartridge unit and said arm.

21. The image forming apparatus of claim 20 wherein an electrical connection is established between said cartridge unit and said image forming apparatus via said electrically conductive arm.

22. The image forming apparatus of claim 20 wherein said electrically conductive arm includes a contact member having a longitudinal extent, and where said cartridge unit contacts said arm along said contact member.

23. The image forming apparatus of claim 22 wherein said cartridge unit includes an electrically conductive protrusion in the direction of said electrically conductive arm such that contact between said cartridge unit and said arm is limited to said protrusion.

24. The image forming apparatus of claim 23 wherein the force exerted on said cartridge unit by said electrically conductive arm varies according to the position of contact of said electrically conductive protrusion along said contact member.

25. The image forming apparatus of claim 24 wherein said force ranges from about 45% to about 150% of the force of said force generating member.
26. The image forming apparatus of claim 25 wherein said contact member has a length of about 16 mm.
27. The image forming apparatus of claim 22 wherein said electrically conductive arm includes a force receiving member, and wherein said force receiving member and said contact member extend from said pivot point at a generally right angle.
28. The image forming apparatus of claim 20 wherein said force generating member is a spring.
29. The image forming apparatus of claim 20 further comprising a second electrically conductive arm, said first and second conductive arms contacting said cartridge unit at opposite ends thereof.
30. The image forming apparatus of claim 20 wherein said removable cartridge unit includes a developer roller operative to develop a latent image by supplying toner thereto.
31. The image forming apparatus of claim 20 wherein said removable cartridge unit includes a photoconductive drum carrying a latent image.
32. The image forming apparatus of claim 20 wherein said removable cartridge unit includes one of a developer roller and a photoconductive drum, and wherein the variable force

applied to said cartridge unit by said electrically conductive arm contributes to the nip force between said one of a developer roller or photoconductive drum and the other of a developer roller or photoconductive drum.

33. A method of controlling the force exerted on different removable cartridge units by an image forming apparatus, comprising:

providing at least one electrically conductive arm pivotally mounted in said image forming apparatus about a pivot point and biased by a force generating member into contact with a removable cartridge unit having at least one electrically conductive protrusion, said arm including a contact member having a longitudinal extent and wherein said protrusion contacts said arm along said contact member;

positioning a first protrusion on a first removable cartridge unit to contact said contact member at a first longitudinal position, said arm thereby exerting a first force on said first cartridge unit; and

positioning a second protrusion on a second removable cartridge unit to contact said contact member at a second longitudinal position different from said first longitudinal position, said arm thereby exerting a second force on said second cartridge unit different from said first force.

34. The method of claim 33 whereby said first force is greater than said second force if said first protrusion on said first cartridge unit contacts said contact member at a position closer to said pivot point, when said first cartridge unit is mounted in said image forming apparatus, than said second protrusion on said second cartridge unit contacts said contact member, when said second cartridge unit is mounted in said image forming apparatus.

35. An image forming apparatus, comprising:
a housing, including two fixed pivot points;
two electrically conductive arms, each pivotally mounted about a different said pivot point, each said arm including a force receiving member and a contact member having a longitudinal extent;
two force generating members, each exerting a first force at a position on the force receiving member of a different said arm, biasing said arm to pivot about said pivot point; and
at least one removable cartridge unit housing a first roller and having two electrically conductive protrusions, each of which contacts the contact member of a different said arm along the longitudinal extent thereof such that each said arm exerts a second force on said cartridge unit through said protrusion.
36. The image forming apparatus of claim 35 wherein said arms and pivot points are disposed in said housing such that said contact members contact said protrusions proximate each end of said cartridge unit, in an axial direction of said first roller.
37. The image forming apparatus of claim 36 wherein the magnitude of said second force varies in response to the relative position of each said protrusion along the longitudinal extent of each said contacting contact member.
38. The image forming apparatus of claim 37 wherein the magnitude of said second force is equal to the magnitude of said first force multiplied by the distance from said pivot point to said position of application on force receiving member, divided by the distance from said pivot point to the position of contact between said protrusion and said contact member.

39. The image forming apparatus of claim 37 wherein said second force is a component of the nip force between said first roller and a second roller in said image forming apparatus.